



## **Mesozoic oceans: life and evolution in both an aragonitic and calcitic world**

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The aragonitic ocean of the present day is not typical of a significant part of the Mesozoic, during which there was a calcitic ocean (*sensu* Stanley, 2006 and Stanley & Hardie, 1998). In the Triassic and early to mid-Jurassic the 'Aragonite II' ocean was the setting for the origin of many organisms with aragonitic shells, structures and tests (e.g., scleractinian corals, planktic foraminifera), with many of these surviving into the calcitic ocean of the late Jurassic and Cretaceous. In the mid-Late Cretaceous high pCO<sub>2</sub> world it is suggested that elevated carbonate saturation levels allowed – for example – benthic communities to both survive and evolve. The Gulf of California has a number of CO<sub>2</sub> and CH<sub>4</sub> gas 'flares' along faults and fractures in areas such as the Wagner Basin which reduce the seawater (in places) to pH 7.4 or 7.5, potentially approaching Cretaceous conditions, but where benthic foraminifera and other macrofauna appear to survive. The changes in biota during the aragonitic ocean to calcitic ocean transition (and back again) are presented in terms of key features of the evolution of both macrofauna and microfossils (e.g., planktic foraminifera). At many key boundaries (e.g., Triassic/Jurassic and Cretaceous/Paleocene) ocean acidification is being invoked as a medium for biotic change but, in an ocean system somewhat different from the present day, how can this mechanism be assessed and can the acidification of the water column in the oceans and shelf seas occur as rapidly as sometimes postulated?